

**I UNIT**

1. What is an electrical drive? Explain with block diagram.
2. What are all the advantages of Electrical drives?
3. What are the choices of electrical drives?
4. Write applications of electrical drives.
5. Explain starting and running characteristics of electrical drives.
6. Explain the types of Electrical braking.
7. Explain load equalization.
8. Explain the types of Loads.

**II UNIT**

1. What are all the advantages of electric heating?
2. Explain briefly about resistance heating.
3. Explain Induction heating.
4. Explain Dielectric heating.
5. What are all the types of electric welding?
6. Explain briefly about resistance welding.
7. Explain the working of arc welding in detail.
8. Compare ac and dc welding.

**III UNIT**

1. Give the definitions for following
  - i. Plane angle
  - ii. Solid angle
  - iii. Luminous flux
  - iv. Illumination
2. Discuss laws of Illumination and its Limitations.
3. What is photometry? Describe its working.
4. Describe one method of measuring brightness of source.
5. What is the function of a i) starter and ii) choke coil in fluorescent lamp?
6. Explain the construction and working principle of i) filament lamp ii) sodium vapour lamp iii) mercury vapour lamp.
7. Explain the various factors to be taken for designing schemes for i) street lighting ii) flood lighting iii) highway lighting.
8. A lamp with mean spherical candle power of 1000 is suspended at a height of 1.2 metres. Determine i) the total flux emitted by the lamp ii) the illumination just below the lamp.
9. A 250V lamp takes a current of 1A and produces a total flux of 4000 lumens. Determine I) the MSCP II) the efficiency of lamp.

**IV UNIT**

1. What do you mean by electric traction

2. Explain in detail the various system traction
3. What is meant by "load equalization?"
4. Describe briefly the features of Traction motor
5. List out the various types of electric bracking
6. Why braking is required ? Explain each of the electrical braking briefly.
7. Explain the working principle of Rheostatic bracking
8. Explain the working principle of Regenerative bracking
9. Derive the expression for the tractive effort during acceleration period of a locomotive train
10. Sketch and explain the static Kramer's variable speed drive system
11. The distance between two stations is 1.92kms. The scheduled speed and the duration of stops respectively are 40kmph and 20sec. Assume the quadrilateral approximation of the speed-time curve and the coasting and braking retardation as 0.16kmphps and 3.2kmphps respectively. Determine the acceleration if the speed at the end of the accelerating period is 60.8kmph. Find also the duration of the coasting period
12. With help of trapezoidal speed time curve derive an expression for the maximum speed and hence estimate the values of acceleration and retardation
13. Explain the quadrilateral speed time curve with suitable expressions.

#### UNIT-V

1. What do you mean by tractive effort
2. What do you mean by tractive force
3. What is adhesion railway
4. Explain how to find specific energy output from simplified speed-time curve
5. Mention the factors that affect the specific energy consumption
6. A 250-ton motor coach having four motors each developing 6,000 N-m torque during acceleration, starts from rest. If the gradient is 40 in 1,000, gear ration is 4, gear transmission efficiency is 87%, wheel radius is 40 cm, train resistance is 50 N/ton, the addition of rotational inertia is 12%. Calculate the time taken to attain a speed of 50 kmph. If the line voltage is 3,000-V DC and the efficiency of motors is 85%. Find the current during notching period.
7. A 100-ton weight train has a rotational inertia of 10%. This train has to be run between two stations that are 3 km apart and has an average speed of 50 km/hr. The acceleration and the retardation during braking are 2 kmphps and 3 kmphps, respectively. The percentage gradient between these two stations is 1% and the train is to move up the incline the track resistance is 50 N/ton, then determine:
  1. Total energy consumption.
  2. Specific energy consumption.